

Physics Based Tool for Rotorcraft Computational Aeroacoustics, Phase I

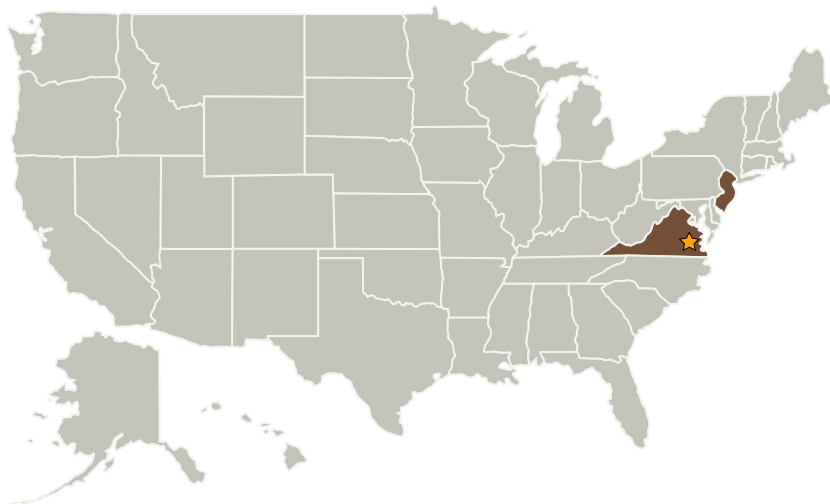
Completed Technology Project (2009 - 2009)



Project Introduction

Reduction of noise is critical to the public acceptance and mission suitability of rotorcraft. Accurate prediction of rotorcraft noise is directly related to the ability to predict the highly complicated interaction between the aerodynamic surfaces and their wakes, and while current numerical tools can, in principle, model the complete rotorcraft, they are severely hampered by modeling assumptions or numerical formulation. Consequently, commonly used tools fail to adequately predict the load distribution, and hence noise, of arbitrarily shaped rotors and fuselages. The proposed effort directly supports NASA's mission of assisting the development of advanced rotorcraft by developing an innovative physics-based multidisciplinary tool for predicting rotorcraft aeroacoustics. This tool, consisting of a fully coupled FUN3D CFD code, VorTran-M module and acoustic propagation model, will be able to address interactional aeroacoustics problems unique to rotorcraft, capturing rotor-fuselage interactions that lead to both structural vibration and undesirable interactional acoustics. This effort will build upon recent work addressing critical issues such as numerical diffusion, grid generation, turbulence modeling and rotorcraft noise prediction and reduction at CDI, GIT and elsewhere. The hybrid code will achieve TRL=4 during Phase I and TRL=7-8 by the end of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Continuum Dynamics, Inc.	Supporting Organization	Industry	Ewing, New Jersey

Primary U.S. Work Locations

New Jersey	Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.4 Aeroacoustics